

DOCKET NO: 285437US0PCT

IN THE UNITED STATES PATENT & TRADEMARK OFFICE

IN RE APPLICATION OF :  
KLAUS SCHULTES, ET AL. : EXAMINER: REDDY, K.  
SERIAL NO: 10/575,929 :  
FILED: APRIL 14, 2006 : GROUP ART UNIT: 1796  
FOR: POLYMER BLEND FOR MATTE :  
INJECTION MOULDED PARTS

REPLY BRIEF

COMMISSIONER FOR PATENTS  
ALEXANDRIA, VIRGINIA 22313

SIR:

The following is responsive to the Examiner's Answer dated December 7, 2009,  
concerning the above-identified application as follows:

REMARKS

The Examiner acknowledges that the present claims limit the materials which may be  
present in the polymer matrix:

...while use of the transitional phrase "consisting essentially of" narrows scope of the polymer matrix to the specified materials and those which do not materially affect the basic and novel characteristics of the claimed invention, absent a clear indication of what the basic and novel characteristics are, "consisting essentially of" is construed as equivalent to "comprising". Further, the burden is on the applicant to show that the additional ingredients in the prior art, i.e., polycarbonate, would in fact be excluded from the claims and that such ingredients would materially change the characteristics of Applicants' invention.

See the paragraph bridging pages 15 and 16 of the Examiner's Answer.

Conversely the Examiner takes an inconsistent position with respect to the breadth of the claimed invention. On the one hand the Examiner acknowledges that the transitional phrase "consisting essentially of" narrows the polymer matrix. On the other hand the Examiner asserts that the use of the transitional phrase "comprising" reverses such narrowing and leaves the claim open to other components.

Appellants submit that the language of the claim is clear. The polymer matrix must include the materials explicitly recited in the claim (e.g., any of the materials (i)-(iv)) but must exclude components that materially affect the basic and novel properties of the claimed invention. The polymer matrix must therefore "consist essentially of" the one or more components (i)-(iv) and thereby exclude other components (such as polycarbonate – see further arguments below). The Examiner's construction of the claims in a manner to interpret the polymer matrix such that is open to any ingredient is inconsistent with both the explicit language of the claim and the Examiner's logic.

The Examiner further erroneously asserts that there is no clear indication which properties of the claimed invention are basic and novel. Appellants submit that such properties include at least the properties that are explicitly recited in the claim; namely, roughness, gloss and Vicat softening point. Appellants submit that the rejection is not supportable to the extent the Examiner failed to give consideration to the basic and novel characteristics of the claimed invention with respect to the properties explicitly recited in the claims.

The Examiner now requires Appellants to submit evidence that the inclusion of the polycarbonate in the polymer matrix will materially affect the basic and novel characteristics of the claimed invention. Appellants point out that those of skill in the art readily recognize that polycarbonate will have a material affect at least the Vicat softening point of the claimed invention.

In order to address the call for evidence in the Examiner's Answer, Appellants submit evidence that those of skill in the art know that polycarbonate has a Vicat softening point substantially different from the minimum value of 90°C recited in Claim 1 and substantially different from the properties of the methacrylate resins exemplified in the specification. As described in the information obtained from [www.lg-dow.com/tech/Thermal.htm](http://www.lg-dow.com/tech/Thermal.htm), polycarbonate has a Vicat softening point that is substantially greater than 90°C (i.e., 147-151°C). In contrast to the high Vicat softening point of polycarbonate plastic, the examples of the present specification have a Vicat softening point of around 110°C.

Appellants submit that it is readily recognized by those of skill in the art that adding a material having such a Vicat softening point to the polymer matrix of the claimed invention will necessarily result in an increase in the Vicat softening point from an initial temperature of around 110°C.

#### The Kress Reference

The Examiner states with respect to the Kress et al patent that component (B) of the composition "reads on" the impact modifier (component (b)) of the present claims. Appellants submit that it does not. Impact modifier component (b) of the present claims is a crosslinked polymethacrylate which is not bound to the polymer matrix material (component (a)). On the other hand, the impact modifier (component (B)) of the patent is *a graft polymer formed from a mixture* of various styrene compounds and methyl methacrylate with (meth)acrylonitrile, maleic anhydride, methyl methacrylate or N-substituted maleimide or mixtures thereof *grafted onto* a rubber having a glass transition temperature  $\leq 10^{\circ}$  C. There is no way to reasonably interpret the impact modifier component of the patent as reading on the more specifically defined impact modifier of the present composition. Finally, Kress et al does not suggest a plastic particle component. Accordingly, the thermoplastic polycarbonate

matrix material of the patent in no way is similar to component (a) of the present claims. The patent therefore does not suggest the present invention, and the rejection based on the combination of Kress et al with Lichtenstein et al fails.

#### The Parker Reference

Appellants maintain that the disclosure of Parker is irrelevant to the present invention, as well as to the Kress et al with Lichtenstein et al patents that have been cited. Parker describes the addition of certain copolymers of acrylic or methacrylic monomers bearing acid functionality (possibly in partially neutralized form) to PVC or copolymers of polyvinyl chloride at low levels which results in a lowered melt viscosity of the chlorinated polymer, yet allows for good fluxing and melt performance, as well as exhibiting desirable physical properties when the blend of polymer materials is cooled. This is of no relevance to the cited primary references, and certainly not the present invention.

#### The Albrecht Reference

Appellants maintain their position that the Albrecht patent, as a secondary patent disclosure, is also irrelevant, not only to the cited primary references, but also to the present invention. The patent discloses a method (not a composition) of forming a molding composition by copolymerizing a monomer mixture of (a) 60 to 90 % of methyl methacrylate, (b) 5 to 25 % of at least one aromatic compound of the indicated formula, (c) 2.5 to 15 % of maleic anhydride and 0 to 5 % of an alkyl acrylate in the absence of a non-polymerizable organic solvent to a conversion of 35 to 60 %, and then continuing the polymerization reaction in an organic solvent to a conversion of at least 80 % by wt. Volatile constituents of the reaction medium are then evaporated from the product which undoubtedly include unpolymerized monomer. The Examiner states that the patent *teaches a*

*thermoplastic molding composition comprising 60 to 90 % of methyl methacrylate, 5 to 25 % of at least one aromatic compound of the indicated formula and 2.5 to 15 % of maleic anhydride (see the top of page 9 of the Examiner's Answer). As seen from the discussion above, this is incorrect because what is shown and described in the patent is a two stage method of polymerizing a monomer mixture where the first step is a conversion of reacting monomers to the extent of 35 to 60 %, followed by a second step of advancing the polymerization to at least 80 wt %. This language does not assure an eventual polymer product of the composition stated by the Examiner. Note that volatile materials are removed from the reaction at the end of polymerization, which volatile matter would include unreacted monomers. This disclosure of a method of polymerizing a mixture of monomers is irrelevant to the compositions of the cited Kress et al and Lichtenstein et al patents, as well as to the present composition as claimed*

#### The Suetterlin Reference

The Examiner cites the Suetterlin et al patent for its disclosure of a methyl methacrylate based, multilayered polymer structure that is useful in a number of applications as an impact modifying agent. The Examiner holds that one of skill in the art would find it an obvious thing to do of substituting the impact modifier taught by Suetterlin et al for the graft impact modifier taught by Kress et al and arrive at the present invention. However, appellants maintain that such a substitution would not be obvious to one of skill since it is not apparent that the impact modifier taught by Suetterlin et al would be compatible with the other components of the composition of Kress et al, especially in view of the fact that the matrix material taught by Kress et al is a thermoplastic polycarbonate matrix material which is not present in the presently claimed composition. Accordingly, the disclosure of Suetterlin et al is not believed to improve upon the deficiencies of the cited and applied prior art.

The Rhein Reference

The Examiner deems the Rhein et al reference as relevant to the present invention, because it relates to the field of methacrylate molding compositions. However, it must be observed that the reference is specifically directed to a method of preparing a thermoplastic molding compound by mixing 60 to 99.95 parts by wt of methyl methacrylate, 0 to 19.95 parts by wt of a C<sub>1-4</sub> alkyl acrylate, 0.05 to 0.25 parts by wt of an alkyl mercaptan accompanied by continuous removal (degassing) of volatile components from the mixture and continuous extrusion of the degassed melt into stranded polymer product. This disclosure is certainly not relevant to a polymethacrylate material as specified in the present claims. In fact, it is not clear at all what the composition is of any given polymer product produced, since the monomer mixture employed on any given occasion is only polymerized to an extent of 30 to 70 %. Of what relevance is the process disclosed to the present molding composition as claimed?

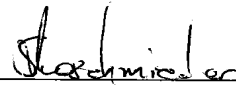
The Examiner continues to hold that because the intrinsic viscosity values of polymer materials disclosed in some of the applied references overlap with the softening point data of (meth)acrylate components (i) and (ii) of the present claims, that this fact renders the present molding composition, at least with respect to the (meth)acrylate component, obvious over the cited prior art (see page 14 of the Examiner's Answer, for instance). Appellants do not concur with this view. It must be made clear that the softening point data of polymer compositions is an entirely different property than intrinsic viscosity values of a polymer. The softening point of a given polymer is determined by the application of thermal energy to a specimen. At a certain temperature the polymer sample being heated softens and this value is observed. On the other hand, the solution viscosity of a polymer is determined by dissolving a polymer sample in a specified solvent such as chloroform and then measuring the viscosity of the

solution at a specific temperature. The methods of determining these two values are very different and completely unrelated. One can not reach a conclusion of what values would be expected for one of the properties of a series of polymer samples tested based on values obtained on the same polymer samples for the other property. Accordingly, the Examiner's attempt at correlating the properties of softening point and solution viscosity as a means of determining obviousness is improper.

For the reasons stated above appellants continue to maintain that the present invention as claimed is unobvious over the cited and applied documents.

Respectfully submitted,

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APPENDIX

Physical Properties of Polycarbonate Resins – LG Dow Website





## TECH. INFORMATION

- [Physical Properties](#)
- [Processing Guideline](#)
- [Troubleshooting Guideline](#)
- [Tech. Notes](#)

## Physical Properties

[+ click for physical properties menu](#)

### Thermal Properties

High heat resistance is a distinguishing characteristic of **CALIBRE\*** polycarbonate resins. For an indication of temperature limits for molded parts, two test methods are used - Deflection Temperature Under Load (DTUL) and Vicat Softening Point values make CALIBRE resins an ideal choice for many parts requiring high thermal stability.

#### Deflection Temperature Under Load

DTUL is measured according to ASTM D 648. The results relate to use temperatures under load and also are a measure of rigidity at service temperatures. DTUL measurements are affected by specimen molding conditions and therefore should be used for screening purposes only and not for direct measurement of specific structural properties of a part, nor for identifying upper limits of a useful temperature range. The typical DTUL of CALIBRE polycarbonate resins - 258 to 270°F (126 to 132°C) - is valid across the full range of melt flow rates. This data was obtained with unannealed, injection-molded specimens 0.125 inch (3.2 mm) thick, under load of 264 psi (1.8 Mpa).

#### Vicat Softening Point

Vicat Softening Point is determined according to ASTM D 1525. Vicat temperatures are generally higher than DTUL temperatures. Measurements of Vicat are more indicative of a polymer's actual softening point than is DTUL, and are not usually affected by specimen molding conditions. The high Vicat of CALIBRE resins is retained throughout the melt flow rate range, decreasing only slightly from 304°F (151°C) to 297°F (147°C) for melt flow rates of 4 to 22. In addition, low Mold Shrinkage (0.005-0.007 in/in [0.005-0.007 mm/mm]) and Coefficient of Linear Thermal Expansion ( $38 \times 10^{-6}$  in/in/°F [ $68 \times 10^{-6}$  mm/mm/°C]) make CALIBRE polycarbonate resins the material of choice for applications requiring tight tolerances at elevated temperatures.

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